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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/546,227	04/10/00	KOIKE K	PM268032

000909
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IM52/0824

EXAMINER	
JOHNSON, E	
ART UNIT	**PAPER NUMBER**
1754	7

DATE MAILED: 08/24/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/546,227	KOIKE ET AL.	
	Examiner	Art Unit	
	Edward M. Johnson	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-103* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-71,73-77,80-93 and 102* is/are rejected.

7)☒ Claim(s) *72,78,79 and 94-101* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Acknowledgment is made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Japan on 2/24/2000.

Acknowledgment is also made of applicant's claim for priority under 35 U.S.C. 119(a)-(d) based upon an application filed in Japan on 4/09/1999. However, a claim for priority under 35 U.S.C. 119(a)-(d) cannot be based on said application, since the United States application was filed more than twelve months thereafter.

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 250 words. It is important that the abstract not exceed 250 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided: The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because the term, "said" is used in line 5. Correction is required. See MPEP § 608.01(b).

Claim Objections

2. Claims 72, 78-79, 94-101, and 103 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

A series of singular dependent claims is permissible in which a dependent claim refers to a preceding claim which, in turn, refers to another preceding claim.

A claim which depends from a dependent claim should not be separated by any claim which does not also depend from said dependent claim. It should be kept in mind that a dependent claim may refer to any preceding independent claim. In general, applicant's sequence will not be changed. See MPEP § 608.01(n).

3. The claims are objected to because of the following informalities: Claim 41, line 13, "a oxygen" appears to be incorrect. Examiner suggests --an oxygen--. Claim 45, line 13,

"rapid cooling" appears incorrect. Examiner suggests --rapidly cooling--. Throughout the claims the phrase "an Si source" appears incorrect. Examiner suggests --a Si source--. Claim 8, line 2, "five" appears incorrect. Examiner suggests --fine--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-71, 73-77, 80-93, and 102 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims contain improper Markush groups. Examiner suggests replacing the phrases, "of at least one of" and, "of at least ones of" with, --selected from the group consisting of--.

The claims contain the terms, "capable of" or "can", which render the claims indefinite because it is unclear whether the limitations immediately following the term (i.e. supporting a catalyst) are part of the claimed invention. See MPEP § 2173.05(d).

The process claims contain the phrase, "comprising the step of", which appears contradictory in view of the multiple step process set forth in the claims. Examiner suggests --comprising--.

The claims contain the phrase, "mainly comprised of", which is unclear as to whether the Applicant intends open or closed language. Examiner suggests --comprising--, --consisting of--, or --consisting essentially of--.

Throughout the claims the phrase, "the surface thereof" lacks antecedent basis.

Throughout the claims the phrase, "said obtained fired honeycomb structure" lacks antecedent basis.

Throughout the claims the phrase, "the temperature used in said firing" lacks antecedent basis.

Regarding claim 102, the term "theoretical" renders the claim indefinite because it is unclear whether the limitation(s) following the term are part of the claimed invention. See MPEP § 2173.05(d).

Claim 4 depends from itself.

Claim 19, the phrase, "larger than 16.99 or smaller than 16.99" is indefinite because it fails to specify units.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in

the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, the claims recite the broad recitations, "reduced pressure" and "low oxygen concentration", and the claims also recite less than 4000 Pa and 0-3% oxygen, which are the narrower statements of the range/limitation.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-4 and 6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Iwase et al. 3,956,186.

Regarding claim 1 Iwase '186 discloses a solid ceramic carrier (see column 5, lines 1-3) for catalytic material comprising lattice defects (see column 2, lines 25-26), pores (see column 3, line 61 and the instant specification, paragraph bridging pages 3-4 (pores formed by defects)), and supporting a catalyst component (see Examples 1-2).

Regarding claims 2 and 6, Iwase '186 discloses a honeycomb structure (see column 3, lines 32-33).

Regarding claim 3, Iwase '186 discloses cracks (see column 2, line 45) and pores (see column 3, line 61 and the instant specification, paragraph bridging pages 3-4 (pores formed by defects)).

Regarding claim 4, Iwase '186 discloses various crystallized states (see column 2, lines 23-24).

8. Claims 1-12 and 15-23, 32-38, and 55, are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sato WO97/32817 or US 6,171,573 B1.

Regarding claims 1, 7, 32, 35, and 55 Sato '573 discloses pore diameters of 8-25 nm (see column 12, lines 47-48), which would correspond to 1-1000 times the ion diameter of a catalyst component, similar to Applicant's assertion (see instant specification, page 4, 2nd full paragraph) and cordierite and crystal lattice (see abstract and column 2, lines 55-58), which would inherently correspond to a number of fine pores of $10^{17}/l$ or more, similar to Applicant's assertion (see instant specification, paragraph bridging pages 4-5).

Regarding claims 2-9, 11-12, 34, and 36 Sato '573 discloses pore diameters of 8-25 nm (see column 12, lines 47-48), which would correspond to 1-1000 times the ion diameter of a catalyst component, similar to Applicant's assertion (see instant specification, page 4, 2nd full paragraph), and honeycomb cordierite and crystal lattice (see abstract and column 2, lines 55-58), which would inherently correspond to a number of fine pores of $10^{17}/l$ or more, similar to Applicant's assertion (see instant specification, paragraph bridging pages 4-5).

Regarding claim 10, Sato '573 discloses a defect having a preferred pore diameter (see column 3, lines 59-62).

Regarding claim 15, Sato '573 discloses honeycomb cordierite and crystal lattice (see abstract and column 2, lines 55-58), which would inherently correspond to a number of fine

pores of 10^{17}/l or more, similar to Applicant's assertion (see instant specification, paragraph bridging pages 4-5).

Regarding claim 16, Sato '573 discloses pore diameters of 8-25 nm (see column 12, lines 47-48).

Regarding claim 17, Sato '573 discloses pore diameters of 8-25 nm (see column 12, lines 47-48), a specific surface area of 200-400 square meters/g and a pore volume of 0.8 ml/g (see column 16, lines 46-47), which, based on three dimensions, would inherently correspond to a pore depth of at least 0.05 nm or more and at least half of the diameter of an ion of a catalyst component, similar to Applicant's assertions (see instant specification, page 4, line 22-24).

Regarding claims 18 and 37-38, Sato '573 discloses various levels of oxygen in the various compounds that make up the carrier which are not between 47-48%.

Regarding claim 19, Sato '573 does not disclose cordierite crystals of only exactly 16.99.

Regarding claims 20-23, Sato '573 discloses honeycombs comprising mainly, which is considered to be at least 0.00004%, cordierite (see column 2, lines 55-58) crystallization and defects (see abstract and column 3, lines 59-62).

Regarding claim 33, Sato '573 discloses cordierite and crystal lattice (see abstract and column 2, lines 55-58;

magnesium), and enough sodium carbonate to control pH from 4 5o 11 (see column 17, lines 43-47).

9. Claims 1-4, 6, 24-31, 39-55, 57, 70-71, and 73-77 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Ichii et al. 5,607,885.

Regarding claims 1, 24, 29, and 55, 57, 70-79, Ichii '885 discloses cordierite honeycomb (see column 3, lines 43-47) with a lattice defect with oxygen vacancies and oxygen storing capability (see column 1, lines 63-66; the term "capability" indicating oxygen may or may not be stored), a composition of more than 48% by weight (see column 5, lines 29-30), and a honeycomb catalyst carrier without a coating (see column 1, lines 17-19), heating to form microcracks, and reheating (see column 4, lines 60-67).

Regarding claims 2-4, 6, 39, 41, 42, 44-46, 53-54, 57, Ichii discloses a process for making cordierite honeycomb (see column 3, lines 43-47) with a lattice defect with oxygen vacancies and oxygen storing capability (see column 1, lines 63-66; the term "capability" indicating oxygen may or may not be stored), and a composition of more than 48% by weight (see column 5, lines 29-30), heat treatment at a temperature (see column 2, lines 65-68) in a crucible (see Examples 8 to 11),

which would inherently be at atmospheric pressure with or without oxygen, in air, "reduced" and "low" both being relative terms, high-purity silica, alumina, and magnesia (see Examples 1-5), and the molar formula of zirconia (see column 2, line 15), which is 26% oxygen by weight, which would correspond to a coefficient of less than 16.99, similar to Applicant's assertion (see instant specification, paragraph bridging pages 13-14), immersing in cold water (see Examples 12 to 18, "high" being a relative term), and suddenly removing and burning dust-containing gas to give a thermal shock (see column 2, lines 26-37; dry etch).

Regarding claim 32, Ichii '885 discloses crystal honeycomb cordierite having cracks (see column 2, lines 26-37).

Regarding claims 25-26, 40, 43, Ichii '885 discloses heat treatment (see column 2, lines 65-68) in a crucible (see Examples 8 to 11), which would inherently be at atmospheric pressure with or without oxygen, "reduced" and "low" both being relative terms.

Regarding claims 27 and 30, Ichii '885 discloses high-purity silica, alumina, and magnesia (see Examples 1-5).

Regarding claims 28 and 31, Ichii '885 discloses the molar formula of zirconia (see column 2, line 15), which is 26% oxygen by weight, which would correspond to a coefficient of less than

16.99, similar to Applicant's assertion (see instant specification, paragraph bridging pages 13-14).

Regarding claims 33, 52, Ichii '885 discloses cordierite and low-soda alumina (see Examples 1 to 5).

Regarding claims 34, 50-51, Ichii '885 discloses thermal shock, which is inherently a vibration (see column 2, lines 26-33).

Regarding claims 47-48 Ichii '885 discloses the melt cooling method (see column 1, line 30).

Regarding claim 49, Ichii '885 discloses cooling to 900 degrees Celsius (see column 2, lines 51-52).

Regarding claims 70-71, Ichii '885 discloses a honeycomb catalyst carrier without a coating (see column 1, lines 17-19), heating to form microcracks, and reheating (see column 4, lines 60-67).

In the event any differences can be shown for the product of the above claims, as opposed to the product taught by the references, each in view of the other, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also *In re Thorpe*, 227 USPQ 964 (Fed.Cir. 1985).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato '373 as applied to claim 7 above, and further in view of Chao et al. 4,956,329.

Sato fails to disclose a compressive strength and thermal expansion coefficient.

Regarding claims 13-14, Chao discloses a compressive strength of at least 31 MPa and a thermal expansion coefficient of less than 5.2 x 10^{-6}/degrees Celsius (see column 2, lines 39-49). Patentable weight was not given to the direction to which this strength is applied because process of using limitations are not generally given patentable weight in product claims absent a showing of unexpected result.

It is considered that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the compressive strength and thermal expansion of Chao in the heavy oil treatment catalyst of Sato because Chao discloses

his compressive strength and expansion coefficient for use in a catalyst employed in processes for refining crude oil (see column 1, lines 6-8)

12. Claims 5, 56, 58-69, 80-93, and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishii '885 as applied to claims 55 above, and further in view of Beauseigneur et al. 5,346,722.

Ishii '885 fails to specifically disclose ceria, catalytic metals, and pore size of 100 nm or less.

Beauseigneur '722 discloses ceria (see abstract) and transition metals (see column 6, line 29 and column 7, lines 65-68), and pore size of less than 5 microns (see column 3, lines 67-68).

It is considered that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the pore diameter, ceria, and metals of Beauseigneur in the honeycomb cordierite of Sato because Beauseigneur discloses his ceria as particularly preferred (see column 6, lines 54-55), in a method of improving thermal shock resistance (title), in a honeycomb cordierite (see column 1, lines 5-24), to support catalyst metals for use as catalyst (see column 7, lines 65-68).

Regarding claims 59-62, Ichii discloses a process for making cordierite honeycomb (see column 3, lines 43-47) with a

lattice defect with oxygen vacancies and oxygen storing capability (see column 1, lines 63-66; the term "capability" indicating oxygen may or may not be stored), and a composition of more than 48% by weight (see column 5, lines 29-30), heat treatment at a temperature (see column 2, lines 65-68) in a crucible (see Examples 8 to 11), which would inherently be at atmospheric pressure with or without oxygen, in air, "reduced" and "low" both being relative terms, high-purity silica, alumina, and magnesia (see Examples 1-5), and the molar formula of zirconia (see column 2, line 15), which is 26% oxygen by weight, which would correspond to a coefficient of less than 16.99, similar to Applicant's assertion (see instant specification, paragraph bridging pages 13-14), immersing in cold water (see Examples 12 to 18, "high" being a relative term), and suddenly removing and burning dust-containing gas to give a thermal shock (see column 2, lines 26-37; dry etch).

Regarding claims 63, 81-93, Beauseigneur '722 discloses pore diameter less than 5 microns (see column 3, lines 67-68) and catalyst metals (see column 7, lines 65-68), including noble metals (see column 8, lines 65-66), and it is considered that it would have been obvious to one of ordinary skill in the art to use at least 0.01% because less would be nearly negligible.

Regarding claim 102, Ichii discloses $2MgO \cdot 2AlO_3 \cdot 5SiO_2$ (see column 5, line 29).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sugiyama et al. 5,628,883 discloses a plasma etching method for producing honeycomb cordierite catalyst; Gustafson 5,273,723 discloses a gas etching method for producing a honeycomb cordierite catalyst; Harada et al. 4,869,944 discloses a cordierite honeycomb-structural body and method for producing; Hamanaka 4,877,670 discloses a cordierite honeycomb structural body and method for making with an improved shock resistance; Ballain et al. 3,943,064 discloses high strength alumina-silica catalyst substrates having high surface areas; Marella et al. 5,750,459 discloses a sol-gel process for obtaining pure and mixed oxide zirconia spheres and microspheres for catalyst in honeycomb channels; and Matsumoto et al. 4,927,799 discloses a catalyst for the purification of exhaust gas comprising various metals.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 703-305-0216. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven P. Griffin can be reached on 703-308-1164. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-3599 for regular communications and 703-305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

STEVEN P. GRIFFIN
SUPERVISORY PATENT EXAMINER
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EMJ
August 14, 2001